

Focus on Research

Update on NHDOT Research: Research Projects Kick Off

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Partnering with UNH

Four NHDOT research projects kicked off in June with UNH as Principal Investigators. Selected by the NH Research Advisory Council in October 2018, these projects will pursue solutions to our transportation challenges.

Improved Practices for Determining the Infiltration Characteristics of Soils for Design of Stormwater Best Management Practices

This project will evaluate a quick method of determining the infiltration rate of soils. Infiltration rates are used to assess the suitability of a site for stormwater best management practices and current testing protocols are time consuming.

Log Jam Monitoring

Next year a natural channel design structure will be installed as stream bank armoring along the Magalloway River/NH 16 in Errol, NH. This project will observe the process, document any stream system changes, and identify the benefits in comparison to conventional armoring.

Assessment of Embedded Culvert Low Flow Hydraulics

This research will diagnose the elements of our culvert bed design and construction to address NHDES' concerns on aquatic organism passage.

Use of Smart Rocks to Improve Rock Slope Design

A smart rock is a sensor system embedded rock that can measure impact and rotational velocity. Rockfall experiments incorporating smart rocks can be used to refine hazard ratings of rock slopes and prioritize remediation efforts.



The NHDOT Research Advisory Council listened to proposed problem statement presentations, assigned a 0 to 5 rating of need, and ranked the statements in order of priority.

Are you strong and fearless?

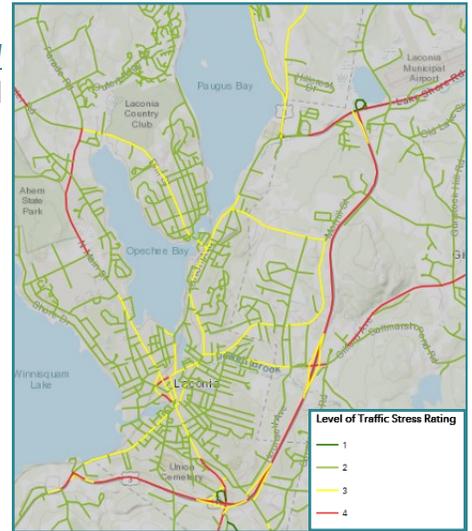
Plymouth State University (PSU) has developed a statewide bicycle network using a NH-specific [Level of Traffic Stress](#) (LTS) model that scores each road segment for a bicyclist.

The network model incorporates a combination of currently available road data:

- existing datasets (NHDOT roadways, Strava bicycling data, and crash reports),
- statewide on-the-ground bike counter,
- efforts to develop and apply a Level of Traffic Stress (LTS) model for bicycling and incorporate novel public participatory GIS approaches.

The LTS network map will enable us to identify and prioritize areas for investment that may increase bicycle network connectivity while decreasing traffic stress encountered by bicyclists.

PSU Principal Investigator:
Amy Villamagna, Ph.D.



Plymouth State
UNIVERSITY
Center for the Environment

Gusset-less Truss - Evaluation of an Innovative Connection

In 2013, the Memorial Bridge, spanning between Portsmouth, NH, and Kittery, ME, was opened to traffic. The structural system of the bridge is composed of truss elements with a unique “Gusset-less” connection which utilizes curved steel to transition from the chords to the diagonals where splice plates join the members.



In this study, the fatigue performance of the connection was investigated through testing of a scale model. The results indicated that, based on the performance of the test specimen, the design assumptions were reasonable.

<https://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/documents/26962m.pdf>



**University of
New Hampshire**
College of Engineering
and Physical Sciences

UNH Principal Investigators:

Erin Bell, Ph.D., P.E. and Ricardo A Medina, Ph.D., P.E.

State Transportation Innovation Council (STIC) Incentive Program

2018 Project Progress

- The Chem Lab in the Bureau of Materials and Research is keeping up with innovation. They added FTIR and XFR instruments to their Toolbox to increase testing capability and efficiency for compounds previously not detected.
- High Resolution Rock Slope 3D mapping – Our Geotechnical Section has photographed 19 rock slopes and processed into 3D point clouds using the STIC purchased photogrammetry software.



2019 Project

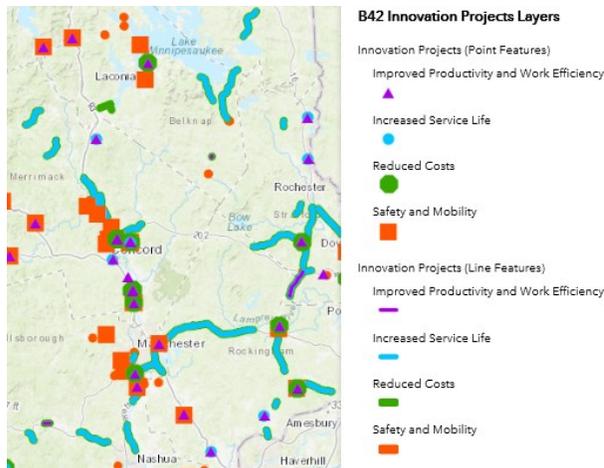
Training sessions for implementing 3D Engineered Models (pending FHWA approval)

A Decade of Innovations

The NHDOT Innovation Viewer is a tool that provides information on the Department’s innovative initiatives that have been put into practice statewide. Designed to provide a centralized resource, the viewer maps the locations and benefit of the new ideas, practices, materials, or activity used.

The initiatives are categorized based on four benefit areas:

- Improved Productivity
- Increase Service Life
- Reduced Cost
- Traffic and Congestion Reduction



[Link to Innovation Viewer](#)

Every Day Counts (EDC) Round 5

In the wake of the FHWA Every Day Counts (EDC) Regional Summit held in October 2018, NHDOT submitted implementation plans to FHWA on the following EDC Round 5 (EDC5) innovations. The selected innovations will be implemented at various stages over the next two (2) years.



- Advanced Geotechnical Exploration Methods - *Development*
- Collaborative Hydraulics: Advancing to the Next Generation (CHANGE) - *Assessment*
- Reducing Rural Departures - *Development*
- Safe Transportation for Every Pedestrian (STEP) - *Demonstration*
- Unmanned Aerial Systems (UAS) - *Assessment*
- Use of Crowdsourcing to Advance Operations - *Demonstration*
- Virtual Public Involvement - *Development*
- Weather-Responsive Management Strategies - *Development*

INNOVATIVE INITIATIVES

NH Partners in Research - NETC Update 2 2018 projects

The New England Transportation Consortium (NETC) is a research cooperative between the state DOTs of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.



Information on active projects are available on the NETC website:

- 18-1 Development of MASH (Manual for Assessing Safety Hardware) Computer Simulated Steel Bridge Rail & Transition Details
- 18-2 Framework of Asphalt Balanced Mix Design for New England Agencies
- 18-3 Integration/Incorporation of Unmanned Aircraft Systems (UAS) into state DOTs

<https://www.newenglandtransportationconsortium.org/>

2019 NETC Symposium held in Concord, NH

On June 19, New England state transportation subject matter experts and university representatives gathered in the topic areas of Materials, Environment, and Bridge Design. The full day event included exchanges of best practices, roundtable discussions, and related poster presentations. The discussions will impact current and future NETC research projects.



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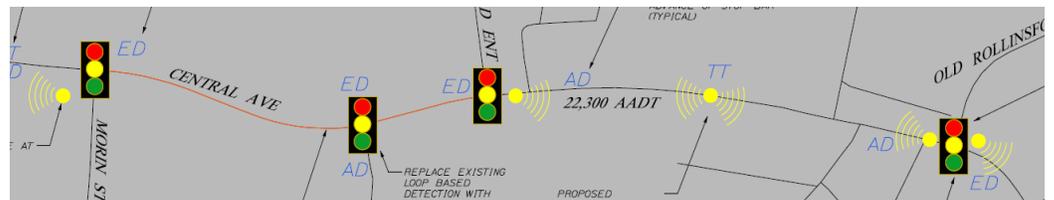
“A man should look for what is, not what he thinks it should be.”

- Albert Einstein
(1879-1955)
Physicist
Nobel Prize
1921



Accelerated Innovative Deployment (AID) Grant for Dover, NH

FHWA awarded Dover, NH, an AID grant to implement a number of Automated Traffic Signal Performance Measures (ATSPMs) that will help improve efficiency, safety, air quality, and mobility. NH was one of the nine grants awarded in 2018 under this program that works with FHWA’s On-Ramp to Innovation Every Day Counts (EDC) program to encourage the delivery of innovation in transportation projects.



Research Section:

<https://www.nh.gov/dot/org/projectdevelopment/materials/research/index.htm>